UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/739,618	12/18/2000	John H. Howard	5181-59100	3682

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EXAMINER
DUONG, THOMAS

ART UNIT	PAPER NUMBER
2145	

DATE MAILED: 07/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)
	09/739,618	HOWARD, JOHN H.
	Examiner	Art Unit	
	Thomas Duong	2145	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 June 2006*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-10, 12-20, 22-27, 29-35, and 40-44* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-10, 12-20, 22-27, 29-35, and 40-44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Response to Amendment

1.   This office action is in response to the applicants Appeal Brief filed on March 17, 2006.
Claims 2-10, 12-20, 22-27, 29-35, and 40-44 are presented for further consideration and
examination.

2.   Applicant's request for reconsideration of the finality of the rejection of the last Office
action is persuasive and, therefore, the finality of that action dated May 26, 2006 is
withdrawn.

3.   In view of the appeal brief filed on March 17, 2006, PROSECUTION IS HEREBY
REOPENED. New grounds of rejection are set forth below.

Response to Argument

4.   Applicant's arguments, see pg.5–pg.16, filed on March 17, 2006, with respect to *claims
2-10, 12-20, 22-27, 29-35, and 40-44* have been fully considered and are persuasive.
The finality of previous rejection is withdrawn.

Claim Objections

5.   <u>*Claims 9-10*</u> are objected to because of the following informalities:

- *claims 9-10* appear to depend on *claim 8*.

During the course of prosecution, examiner will treat as such. Please make the

appropriate correction.

Claim Rejections - 35 USC § 102

6.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7.   *Claims 2-3, 8, 12-15, 18, 22-23, 29-32, 35, and 40-44* are rejected under 35 U.S.C.

102(b) as being anticipated by Kozakura (US005724581).

8.   With regard to *claims 2, 8, 12, 22, 29, and 40*, Kozakura discloses,

- *a non-volatile memory storing a first inode locating a first file in said storage and

  also storing a journal comprising a list of committed inodes; and* (Kozakura, col.1,

  lines 40-50; col.2, lines 48-58, lines 18-26; col.3, lines 29-54; col.4, line 41 –

  col.5, line 41; col.6, line 58 – col.7, line 15; col.20, lines 23-34; col.20, line 48 –

  col.21, line 42)

  Kozakura discloses, "*a current page table 2 is provided in the main storage unit

  and manages the position information in the data base storage unit concerning

  the latest physical page storing the latest updated data and the shadow physical

  page storing the data before the latest update*" (Kozakura, col.4, lines 41-45) and

  "*a current table management table 3 is provided in the main storage unit and

  manages as a shadow page table the current page table whose backup data are*

copied when a checkpoint is recorded, and manages the current page table

updated after the checkpoint as the latest page table" (Kozakura, col.4, lines 46-

51). In addition, Kozakura discloses, *"the log of a transaction is stored in a log*

file in the secondary storage unit at the completion of the transaction. If a system

failure occurs, the data base restores its state before the failure based on the

page table management table and the page table stored as backup data in the

secondary storage unit, and the log file" (Kozakura, col.3, lines 44-49).

Furthermore, Kozakura discloses, *"a non-volatile semiconductor memory such as*

a flash memory, a RAM disk, etc. can be used as the secondary storage unit 40"

(Kozakura, col.20, lines 28-30). Hence, Kozakura teaches of a *"current page*

table for managing position information about [the] latest physical page storing

latest updated data and a shadow physical page storing the data before [the]

latest update" (Kozakura, col.20, lines 54-57) and a current page table

management table for pointing to the latest page table as well as the shadow

page table.

- *a block manager configured to copy said first inode to a second inode, wherein*

  said block manager is configured to change said second inode in response to

  updates to said first file, and wherein said block manager is configured to

  atomically update said first file in response to a commit of said first file by writing

  said second inode to said non-volatile memory, whereby said second inode

  locates said first file in said storage, and wherein said block manager is

  configured to record said second inode in said journal. (Kozakura, col.1, lines 40-

  50; col.2, lines 48-58, lines 18-26; col.3, lines 29-54; col.4, line 41 – col.5, line 41;

  col.6, line 58 – col.7, line 15; col.20, lines 23-34; col.20, line 48 – col.21, line 42)

Kozakura discloses the first updating unit 7 *"[obtaining] a currently unused*

physical page, [copying] data in the latest page table to the physical page, and

enters the copied data in the management table 3 as the latest page table for the

logical page. The copied-from latest page table is entered in the current page

table management table 3 as a shadow page table. Then, the newly-obtained

physical page is set in the blank page management unit 6 as a physical page

being used" (Kozakura, col.5, lines 6-13), in response to *"when data on a logical*

page are updated as a result of an execution of a transaction" (Kozakura, col.4,

lines 66-67). In addition, Kozakura discloses, *"a second updating unit 8*

[referring] to the current page table 2 which has been updated by the first

updating unit 7, and writes the updated data on the logical page to the latest

physical page corresponding to the logical page whose data are stored in the

current page table 2 and should be updated. Then, it changes the position

information pointing to the shadow page corresponding to the logical page in the

current page table such that the information indicated the latest physical page"

(Kozakura, col.5, lines 24-32). Hence, Kozakura teaches of a *"current page table*

for managing position information about [the] latest physical page storing latest

updated data and a shadow physical page storing the data before [the] latest

update" (Kozakura, col.20, lines 54-57), a current page table management table

for pointing to the latest page table as well as the shadow page table, and

updating the table accordingly in response to execution of a transaction.

9.   With regard to <u>claims 3, 18, 23, and 35</u>, Kozakura discloses,

- *wherein said commit of said first file comprises a commit command received from an external source which updates said first file.* (Kozakura, col.1, lines 40-50; col.2, lines 48-58, lines 18-26; col.3, lines 29-54; col.4, line 41 – col.5, line 41; col.6, line 58 – col.7, line 15; col.20, lines 23-34; col.20, line 48 – col.21, line 42)

10.   With regard to <u>claims 13 and 30</u>, Kozakura discloses,

- *further comprising writing a master inode corresponding to an inode file including said second inode to a checkpoint record in said journal.* (Kozakura, col.1, lines 40-50; col.2, lines 48-58, lines 18-26; col.3, lines 29-54; col.4, line 41 – col.5, line 41; col.6, line 58 – col.7, line 15; col.20, lines 23-34; col.20, line 48 – col.21, line 42)

11.   With regard to <u>claims 14-15 and 31-32</u>, Kozakura discloses,

- *wherein recovering from a system failure comprises:*
  - *scanning said journal to locate a most recent checkpoint record and zero or more inodes subsequent to said most recent checkpoint record within said journal;* (Kozakura, col.1, lines 40-50; col.2, lines 48-58, lines 18-26; col.3, lines 29-54; col.4, line 41 – col.5, line 41; col.6, line 58 – col.7, line 15; col.20, lines 23-34; col.20, line 48 – col.21, line 42)
  - *copying said master inode from said most recent checkpoint record to a volatile memory; and* (Kozakura, col.1, lines 40-50; col.2, lines 48-58, lines 18-26; col.3, lines 29-54; col.4, line 41 – col.5, line 41; col.6, line 58 – col.7, line 15; col.20, lines 23-34; col.20, line 48 – col.21, line 42)

- *updating an inode file corresponding to said master inode with said one or more inodes subsequent to said most recent checkpoint record.* (Kozakura, col.1, lines 40-50; col.2, lines 48-58, lines 18-26; col.3, lines 29-54; col.4, line 41 – col.5, line 41; col.6, line 58 – col.7, line 15; col.20, lines 23-34; col.20, line 48 – col.21, line 42)

- *wherein said updating said inode file comprises:*

  - *copying one or more blocks of said inode file storing said one or more inodes to a copied one or more blocks; and* (Kozakura, col.1, lines 40-50; col.2, lines 48-58, lines 18-26; col.3, lines 29-54; col.4, line 41 – col.5, line 41; col.6, line 58 – col.7, line 15; col.20, lines 23-34; col.20, line 48 – col.21, line 42)

  - *updating said master inode in said volatile memory to point to said copied one or more blocks.* (Kozakura, col.1, lines 40-50; col.2, lines 48-58, lines 18-26; col.3, lines 29-54; col.4, line 41 – col.5, line 41; col.6, line 58 – col.7, line 15; col.20, lines 23-34; col.20, line 48 – col.21, line 42)

12.   With regard to *claims 41-44*, Kozakura discloses,

- *wherein the first file in the non-volatile memory is a first version of the first file, and wherein the block manager is configured to create a second version of the first file in response to a first write command of the plurality of write commands, and wherein the block manager is configured to atomically replace the first version with the second version in response to the commit command.* (Kozakura, col.1, lines 40-50; col.2, lines 48-58, lines 18-26; col.3, lines 29-54; col.4, line 41 – col.5, line 41; col.6, line 58 – col.7, line 15; col.20, lines 23-34; col.20, line 48 – col.21, line 42)

- *wherein the first version is associated with a first inode, and wherein the second version is created by copying the first inode to a second inode and modifying the second inode, and wherein the atomic update is performed by writing the second inode. (Kozakura, col.1, lines 40-50; col.2, lines 48-58, lines 18-26; col.3, lines 29-54; col.4, line 41 – col.5, line 41; col.6, line 58 – col.7, line 15; col.20, lines 23-34; col.20, line 48 – col.21, line 42)*

- *wherein the storage is an object-based storage and wherein the plurality of write commands and the commit command address a first object corresponding to the first file. (Kozakura, col.1, lines 40-50; col.2, lines 48-58, lines 18-26; col.3, lines 29-54; col.4, line 41 – col.5, line 41; col.6, line 58 – col.7, line 15; col.20, lines 23-34; col.20, line 48 – col.21, line 42)*

- *further comprising a second computing node coupled to the interconnect, wherein the second computing node is configured to generate a second plurality of write commands to update the first file and a second commit command defined to commit the updates to the first file, and wherein the second computing node is configured to transmit the second plurality of write commands and the second commit command on the interconnect, and wherein the storage is configured to atomically update the first file to reflect the second plurality of write commands responsive to the second commit command. (Kozakura, col.1, lines 40-50; col.2, lines 48-58, lines 18-26; col.3, lines 29-54; col.4, line 41 – col.5, line 41; col.6, line 58 – col.7, line 15; col.20, lines 23-34; col.20, line 48 – col.21, line 42)*

Claim Rejections - 35 USC § 103

13.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14.   *Claims 4-5, 9-10, 19-20, and 24-25* are rejected under 35 U.S.C. 103(a) as being

obvious over Kozakura (US005724581) and in view of Fuller (US005870757A).

15.   With regard to *claims 4-5, 9-10, 19-20, and 24-25*, Kozakura discloses,

See *claims 3, 8, 18, and 23* rejection as detailed above.

However, Kozakura does not explicitly disclose,

- *wherein said commit command comprises a file close command.*

- *wherein said commit command comprises an fsync command.*

Fuller teaches,

- *wherein said commit command comprises a file close command.* (Fuller, col.1,

   line 51 – col.3, line 48; col.22, line 35 – col.23, line 23)

   Fuller discloses of available transactional commands such as: 'close', 'fsync',

   'read', 'write', 'commit', etc. that can cause the execution of a transaction.

- *wherein said commit command comprises an fsync command.* (Fuller, col.1, line

   51 – col.3, line 48; col.22, line 35 – col.23, line 23)

- *Fuller discloses of available transactional commands such as: 'close', 'fsync',*

   'read', 'write', 'commit', etc. that can cause the execution of a transaction.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of

the invention was made to combine the teachings of Fuller with the teachings of

Kozakura to provide a *"single transaction technique for journaling file systems ...*

[that overcome] the performance degradation which may be experienced in

conventional journaling file systems by entering each file system operation into the

current active transaction" (Fuller, col.1, lines 51-55). In addition, Fuller anticipates,

"in addition to increasing overall file system performance under even light computer

system operational loads, even greater performance enhancement is experienced

under relatively heavy load" (Fuller, col.1, lines 59-62).

14.   *Claims 6-7, 16-17, 26-27, and 33-34* are rejected under 35 U.S.C. 103(a) as being

obvious over Kozakura (US005724581) and in view of Zheng et al. (US006571259B1).

16.   With regard to *claims 6-7 and 26-27*, Kozakura discloses,

See *claims 2 and 22* rejection as detailed above.

However, Kozakura does not explicitly disclose,

* *wherein said journal further includes a checkpoint record including a description*

  of an inode file, a block allocation bitmap, and an inode allocation bitmap.

* *wherein the description comprises inodes for each of said inode file, said block*

  allocation bitmap, and said inode allocation bitmap.

Zheng teaches,

* *wherein said journal further includes a checkpoint record including a description*

  of an inode file, a block allocation bitmap, and an inode allocation bitmap.

  (Zheng, col.3, line 3 - col.4, line 14; col.13, line 66 – col.15, line 47)

- *wherein the description comprises inodes for each of said inode file, said block*
  allocation bitmap, and said inode allocation bitmap. (Zheng, col.3, line 3 - col.4,
  line 14; col.13, line 66 – col.15, line 47)

Therefore, it would have been obvious to one of ordinary skill in the art at the time of
the invention was made to combine the teachings of Zheng with the teachings of
Kozakura to provide an alternate method of *"[recovering] from a system failure by*
restoring the database to its consistent state existing just after commitment of the
last completed transaction ... [by maintaining] a log file of the database changes and
the commit commands ... [including] a sufficient amount of information (such as
'before' and 'after' images) in order to undo the changes made to the database since
the last commit command" (Zheng, col. 1, line 67 - col.2, line 8). In addition,
according to Kozakura, *"the log of a transaction is stored in a log file in the*
secondary storage unit at the completion of the transaction. If a system failure
occurs, the data base restores its state before the failure based on the page table
management table and the page table stored as backup data in the secondary
storage unit, and the log file" (Kozakura, col.3, lines 44-49).

17.   With regard to *claims 16-17 and 33-34*, Kozakura and Zheng disclose,

- *wherein said block map further comprises a first inode allocation bitmap*
  indicating which inodes within said first inode file are allocated to files, the
  method further comprising:
  - *copying said first inode allocation bitmap to a second inode allocation bitmap;*
    (Kozakura, col.1, lines 40-50; col.2, lines 48-58, lines 18-26; col.3, lines 29-
    54; col.4, line 41 – col.5, line 41; col.6, line 58 – col.7, line 15; col.20, lines*

23-34; col.20, line 48 – col.21, line 42; Zheng, col.3, line 3 - col.4, line 14;

col.13, line 66 – col.15, line 47)

- *modifying said second inode allocation bitmap to reflect one or more inodes*

  allocated to new files; and (Kozakura, col.1, lines 40-50; col.2, lines 48-58,

  lines 18-26; col.3, lines 29-54; col.4, line 41 – col.5, line 41; col.6, line 58 –

  col.7, line 15; col.20, lines 23-34; col.20, line 48 – col.21, line 42; Zheng,

  col.3, line 3 - col.4, line 14; col.13, line 66 – col.15, line 47)

- *establishing a third inode within said block map to said second inode*

  allocation bitmap subsequent to said modifying said second inode bitmap.

  (Kozakura, col.1, lines 40-50; col.2, lines 48-58, lines 18-26; col.3, lines 29-

  54; col.4, line 41 – col.5, line 41; col.6, line 58 – col.7, line 15; col.20, lines

  23-34; col.20, line 48 – col.21, line 42; Zheng, col.3, line 3 - col.4, line 14;

  col.13, line 66 – col.15, line 47)

- *wherein said block map further comprises a first block allocation bitmap*

  indicating which blocks within a storage including said block map are allocated to

  files, the method further comprising:

  - *copying said first block allocation bitmap to a second block allocation bitmap;*

    (Kozakura, col.1, lines 40-50; col.2, lines 48-58, lines 18-26; col.3, lines 29-

    54; col.4, line 41 – col.5, line 41; col.6, line 58 – col.7, line 15; col.20, lines

    23-34; col.20, line 48 – col.21, line 42; Zheng, col.3, line 3 - col.4, line 14;

    col.13, line 66 – col.15, line 47)

  - *modifying said second block allocation bitmap to reflect one or more blocks*

    allocated to files; and (Kozakura, col.1, lines 40-50; col.2, lines 48-58, lines

    18-26; col.3, lines 29-54; col.4, line 41 – col.5, line 41; col.6, line 58 – col.7,

line 15; col.20, lines 23-34; col.20, line 48 – col.21, line 42; Zheng, col.3, line

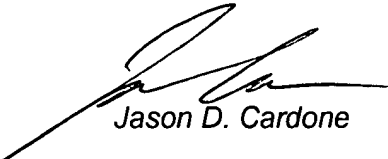3 - col.4, line 14; col.13, line 66 – col.15, line 47)

- *establishing a fourth inode within said block map to said second block*

  allocation bitmap subsequent to said modifying said second block allocation

  bitmap. (Kozakura, col.1, lines 40-50; col.2, lines 48-58, lines 18-26; col.3,

  lines 29-54; col.4, line 41 – col.5, line 41; col.6, line 58 – col.7, line 15; col.20,

  lines 23-34; col.20, line 48 – col.21, line 42; Zheng, col.3, line 3 - col.4, line

  14; col.13, line 66 – col.15, line 47)

Conclusion

16.   Any inquiry concerning this communication or earlier communications from the examiner

should be directed to Thomas Duong whose telephone number is 571/272-3911. The

examiner can normally be reached on M-F 7:30AM - 4:00PM. If attempts to reach the

examiner by telephone are unsuccessful, the examiner's supervisor, Jason D. Cardone

can be reached on 571/272-3933. The fax phone numbers for the organization where

this application or proceeding is assigned are 571/273-8300 for regular communications

and 571/273-8300 for After Final communications.

Thomas Duong (AU2145)   *Jason D. Cardone*

July 7, 2006   *Supervisory PE (AU2145)*